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NOTE

ON THE

HISTORY OF CARBOLIC ACID AND ITS COMPOUNDS IN SURGERY PRIOR TO 1867.

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(From the *LANCET* for November 2, 1867.)

THE communication on the antiseptic properties of carbolic acid which Professor Lister published in the *Lancet* of the 21st of September 1867, was originally read by him at the meeting of the British Medical Association in August last at Dublin. In the discussion which followed, Dr. Hingston of Montreal stated to the Surgical Section that, in travelling last summer over the Continent, he had found that the use of carbolic acid in surgery was now being discontinued in places where formerly it was in vogue; while in Great Britain he had seen it poured into and over the surfaces of recent amputation, and other wounds, in the form of a fluid ointment or combined with oil, in a way which recalled to his mind the olden and reprehensible system of dressing with some foreign body the whole raw surfaces of recent wounds—a practice that was followed two or three centuries ago, and which he fondly imagined was banished from scientific surgery.

Discussion
on Carbolic
Acid in
Dublin in
August
1867.

On the same occasion, amongst some other remarks, I stated that—contrary to what Professor Lister seems inclined to maintain—carbolic acid had been used for some years past in surgery in France, Germany, etc., and that his use and applications of it—and his theory of its mode of action—were not in any way original.

For Mr. Lister's papers on the subject of carbolic acid have all been published within the course of the present year, commencing in the *Lancet* for March 16, 1867.

Date of Mr.
Lister's
first paper;

But in 1863 Dr. Lemaire of Paris published an extensive and able monograph on carbolic acid, or phenic acid (as it is more usually designated in French works), and described at length its employment in a great diversity of surgical and medical diseases. A second edition of Dr. Lemaire's work appeared in 1865, and extends to 750 pages. The book is entitled, *De l'Acide Phénique, de son action sur les Vegetaux, les Animaux, les Ferments, les Venins, les Virus, les Miasmes; et de ses Applications à l'Industrie, à l'Hygiène, aux Sciences Anatomiques, et à la Thérapeutique*. He enters fully into its chemical and general history, and its numerous applications to sanitary science, veterinary practice, etc. Above 300 pages are devoted to its

of Le-
maire's mo-
nograph,
1863.

2d edition,
1865.

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therapeutical effects and the theory of them; and more than 250 of these pages contain a series of comments on diseases and illustrative cases, surgical and medical, in which it has been used.

In 1865 Dr. Déclat published at Paris another volume of above 190 pages on the same subject, and Dr. Déclat's theory is sufficiently signified in the very title of his book, *Nouvelles Applications de l'Acide Phénique en Médecine et en Chirurgie, aux Affections occasionnées par les Microphytes, les Microzoaires, les Virus, les Ferments, etc.* Dr. Déclat states (p. 24) that he first employed carbolic acid as a local application in the proportion of one part of acid to ten of water, and with great success, in 1861, in the case of an extensive gangrenous wound of the thigh. "From that time," he adds, "M. Maisonneuve"—who saw the case with him, and witnessed the surprising action obtained—"has not ceased to employ, at the Hôtel Dieu, carbolic acid as an habitual dressing. Thus the wards of his service are rendered pure and healthy (*assainies*), and the results are most satisfactory and most remarkable. Several of our colleagues already imitate this example, and at this date (1865) carbolic acid is frequently employed in practice in the city and in some hospital services."

Originally in France carbolic acid was employed in surgery in the form of a powder made of coal-tar and lime,* as suggested by MM. Corne and Demeaux in 1859. Shortly after its introduction, surgical experiments were made with it in the hospitals of Paris and in the French army in Italy after the battles of Magenta and Solferino.† These experiments gave it, to use the language of Dr. Lemaire, "un grand retentissement." "Le fait principal," he adds, "la désinfection, était admis et vanté avec enthousiasme." M. Cabannes subsequently suggested the mixture of coal-tar with other mineral and various vegetable powders, besides gypsum; but their introduction was, as stated by Lemaire, difficult when the wounds were anfractuous or fistulous. Afterwards M. Le Bœuf made a still more elegant and useful preparation of the coal-tar, in the form of a fixed emulsion with saponine; a form which Dr. Lemaire seems still to prefer, in some surgical complications, to the pure carbolic acid diluted or otherwise modified.

At last Mr. Calvert in England, and Parisel and Bouchardat in France, showed by their chemical investigations that carbolic acid is the essential principle to which coal-tar owes its antiseptic properties, as opium owes its soporific properties to morphia, cinchona its febrifuge properties to quinine, etc.

* Professor Bottini, in his essay, "Dell' Acido Fenico nella Chirurgia Pratica," etc., Milan, 1866, states that he began using carbolic acid itself in 1862, and had by 1866 employed it in six hundred cases.

† It consisted of 100 parts of plaster, thoroughly triturated with 1 to 5 parts of coal-tar, and formed a grey powder, with a slightly bituminous odour. Sometimes it is applied in the form of powder. Sometimes it was made into a kind of ointment, putty, or paste (like that made by carbolic acid in later times), by mixing the plaster and coal-tar with olive-oil. This ointment or paste was spread thickly on lint, and applied like a poultice. When the powder is used and sprinkled over the part no charpie is required.—See *Edinburgh Monthly Medical Journal* for 1860, p. 263.

Déclat's
Work,
1865.

Used in
France in
1859.

Observa-
tions of Cal-
vert, etc.

Antiseptic
plaster and
oil in 1860.

Mr. Lister remarks (*Lancet*, September 21, 1867) that when it had been shown, by the researches of Pasteur, that the septic property of the atmosphere depended on minute living organisms suspended in it, "it occurred to me," to use his own words, "that decomposition in the injured part might be avoided, without excluding the air, by applying as a dressing some material capable of destroying the life of the floating particles. Upon this principle I have based a practice. . . . The material which I have employed is carbolic or phenic acid, a volatile organic compound, which appears to exercise a peculiarly destructive influence upon low forms of life."

Mr. Lister's Theory, 1867.

Now the very same theory—the very same practice—and the very same measure for reducing that theory to practice, have all been worked out and published on the Continent years ago by Lemaire, Déclat, Küchenmeister, and others. The strongest averments cannot alter the simplest dates, and I fear that it will not redound to the credit and character of English surgery to claim for it what most certainly does not pertain to it.

anticipated by several writers,

In his work on Carbolic Acid, Dr. Lemaire enters elaborately and philosophically into the question of septic infusoria in the atmosphere, and discusses the opinion of Schultze, Schwann, Pasteur, Pouchet, Helmholtz, Milne-Edwards, Bernard, Gratiolet, and others, upon the subject. His conclusions are that the air does contain these alleged low vital organisms; that when admitted to wounds, ulcers, etc., they produce a decomposition in the part and secreted fluids, aiding the formation of pus; that this decomposition is effected by a vital action similar to the production and multiplication of organisms in the process of fermentation; and that carbolic acid—even in very small doses—has the power of preventing and of arresting any such decomposing effects from these organisms by at once and immediately destroying the life of the organisms themselves.

as Lemaire. * Septic infusoria in the air killed by it.

Mr. Lister has hitherto chiefly or only described, I believe, three kinds of surgical complications in which he has employed carbolic acid—namely (1) in compound fractures; (2) in suppurations; and (3) in wounds. In all of these points he has been long forestalled by the experience of our continental neighbours.

Surgical uses of Carbolic Acid.

1. *In Compound Fractures.*—Two of the hospital surgeons of Bayonne—namely, MM. Darrican and Petit—used it in compound fractures of the limbs, under the form of saponified coal-tar, as early as 1860. In 1862, in a case of severe comminuted fracture of four fingers, attended by Dr. Lemaire, irrigations with cold water were at

Used in Compound Fractures.

* In October 1860 Dr. Lemaire read at Paris, before the Imperial Academy of Sciences, and afterwards published, a paper full of experiments, entitled "Considérations sur le Rôle des Infusoires et des Matières Albuminoïdes dans la Fermentation," etc. In June of the same year (1860) he presented to the Academy a memoir trying to show that pus is a product of secretion and fermentation. Mr. Lister (see the *Lancet* for October 5, 1867) incautiously declares that Dr. Lemaire's book on Carbolic Acid "does not appear to have attracted the notice of our profession." But the sale of the first edition of it was so rapid as to surprise both author and publisher, and two hundred copies were asked for after the edition was exhausted. Has any English monograph on any individual medical agent ever met with such marked success?

Success of Lemaire's Book.

first tried, with excessive suffering, and sleeplessness for forty-eight hours. An emulsion of coal-tar was then applied, with speedy abatement of the pain (for sometimes it acts anaesthetically), and ultimate healing of all the bones and soft parts. "This beautiful result," observes Lemaire, "appeared to me to indicate the employment of this treatment in cases of comminuted fractures of the limbs, before having recourse to amputation."

In Abscesses, etc.

2. *In Suppurations and Abscesses.*—"When a wound is recent, saponified coal-tar," remarks Dr. Lemaire, "prevents the formation of pus. If the wound is of old standing, it deterges the diseased parts, disinfects them by killing the living ferments, and diminishes rapidly the suppuration by protecting the tissues and the products which they secrete from a new fermentation" (p. 641). With carbolic acid, or saponified coal-tar as containing carbolic acid, "I can arrest and reproduce at will," asserts Dr. Lemaire, "the formation of pus, as I am able (by the same means) to arrest and reproduce fermentation and germination" (p. 20). In evidence of its power in curing abscesses he cites a case of very fetid scrotal abscess connected with urethral disease, where the injection of a solution with emulsion of coal-tar disinfects the discharge in an hour, and arrested the suppuration in forty-eight hours, followed by rapid cicatrisation. M. Maisonneuve injects successfully, with a solution of carbolic acid, deep-seated abscesses where the pus lodges and putrefies (pp. 435 and 364).

In Wounds.

3. *In Wounds.*—As a dressing to wounds, different French, German, and Spanish surgeons have used it in various civil hospitals, as well as in the Italian, Morocco, and Mexican wars. Eight years ago (or in 1859) it had been already used in wounds by Cruveilhier, Follet, and Rigault, and was employed as a dressing to bedsores in the Military Hospital of Munich.* Perhaps the most celebrated Parisian hospital surgeon at present is M. Maisonneuve of the Hôtel Dieu. He has lately written me that he first used carbolic acid in 1861 as a dressing to a bedsore, and from that time has employed it in a very large number of wounds, and made general use of it in his wards for dressings of all sorts—as in wounds, compound fractures, simple and carcinomatous ulcers, etc. In his work Dr. Lemaire attests the continued frequency with which it has thus been employed in the Hôtel Dieu; and he adduces evidence of its use by various other surgeons. "Thousands of well-observed facts," he remarks (p. 365), "have demonstrated that saponified coal-tar disinfects instantly the most fetid wounds. . . . They obtain the same results with carbolic acid, but it is less durable in its results than saponified coal-tar. They not only disinfect, but they also prevent putrid fermentation. The quantity of pus produced is insignificant as compared with the quantity which forms with other dressings. The emanations from these substances spread through the wards of the hospital, and render the atmosphere healthy" (p. 366). In this way *Pyæmia* is prevented by the use of carbolic acid (see pp. 21, 364, etc.)

Hôtel Dieu, 1861.

Against Pyæmia.

* See *Deutsche Klinik* for 1860, p. 123.

About three years ago carbolic acid was used in the Edinburgh Infirmary as a wash to the surfaces of amputation wounds by my colleague, Professor Spence, President of the College of Surgeons. In a manuscript copy of his lectures, taken by one of his students, and which I have seen, when speaking of amputations in his lecture of February 27, 1865, he observes: "I paint over the surface with iodine, or, where the limb is diseased or chronic abscess exists, with methylated spirits containing a small proportion of carbolic acid." Professor Spence tells me he gave up the use of carbolic acid, as it did not seem to produce so much benefit, as other applications, in the cases where he employed it.

In Edinburgh Infirmary before 1865.

Dr. Lemaire has applied carbolic acid to the treatment of numerous *other Surgical Complications* and diseases besides the three especially mentioned by Mr. Lister. In his work he has adduced, for example, cases and remarks to show its utility as an antiseptic and healing agent in simple scrofulous ulcers, etc.; in burns; in venomous bites; in dissection wounds; in sloughing and gangrene of the soft tissues (the ravages of gangrene, he says, have often thus been stopped as if by enchantment, p. 23); in inflammation, caries, and necrosis of bone, in inflammation and abscess of joints; in whitlows; in carbuncles (where its action, he avers, is marvellous, p. 450, probably from their containing living organisms, which he thinks he has detected with the microscope, p. 176); in lupus; in cancerous discharges; in ozaena and otorrhœa; in chancre; in gonorrhœa; in catarrh of the bladder as an injection, and as an injection also in fistulæ, and into the cavities of cysts, etc. He gives various disquisitions, with cases illustrative of its employment in different forms of skin-diseases, particularly in those which arise from the presence and irritation of low animal and vegetable organisms. It aborts pustules of cow-pox and small-pox when applied to them. Internally, again, he has used it in the form of vapour, solution, etc., to apthæ, angina, diphtheria, croup, whooping-cough, etc., and in some diseases of the intestinal canal, as dyspepsia (would not the form complicated with sarcinæ be benefited by it as much as by sulphurous acid compounds?), in dysentery, cholera, etc. And he suggests further trial of it internally in some contagious diseases, as scarlatina and measles; in agues and malarious diseases, and various other maladies, where low vegetable or animal organisms may be possibly supposed to exist. This rapid and imperfect enumeration shows in itself the great thought and attention which Dr. Lemaire has bestowed on the therapeutical action and applications of carbolic acid; in that respect, as well as in originality, leaving Professor Lister very far behind him. On one or two points—but these of a most doubtful character—Professor Lister goes, perhaps, further, for he seems actually to believe that the use of carbolic acid may lead to the absorption of a piece of necrosed bone, or of a silken ligature when cut short and left in a wound—a kind of surgical effect in which I think he will get few or no disciples to join

Lemaire's other systematic applications of it.

Internal uses of Carbolic Acid.

him at the present day, though such physiological deeds were credited by some of the olden surgical pathologists.

Carbolic
Acid in
Germany in
1860.

They seem to have used carbolic acid, therapeutically and surgically, earlier in Germany than in France. In the *Year-Book* of the Sydenham Society for 1860, at p. 486, we find a notice of the disinfection of the sewage of Carlisle by carbolic acid, and brief analyses of Demeaux's disinfecting charpie and of Corne and Demeaux's disinfecting powder; and at p. 487 a notice of the disinfectant powers of carbolic acid itself, by Dr. Küchenmeister of Dresden. "Under the name of spiroï," it is said, "Küchenmeister describes phenic or carbolic acid as a colourless crystalline body, which fuses at 34° (Cent.), and boils at 187°; and is obtained from oil of coal-tar, as well as by the distillation of salicine with lime. Küchenmeister has applied the carbolic acid with the most satisfactory results both in medical and surgical practice, and as a means of arresting putrefaction and *preventing the development of fungi*." This last remark is the more interesting as it preceded the observations of Pasteur.

Notices of
it in Eng-
lish Jour-
nals.

Mr. Lister, in his letter to the *Lancet*, October 5, states that "all his recent visitors to the Glasgow Royal Infirmary had viewed his treatment of wounds, abscesses, compound fractures, etc., with carbolic acid, as original. . . . Not one," he adds, "had ever expressed the slightest doubt that the system in question was *entirely new*." While I regret the strange and almost incomprehensible want of knowledge with which Mr. Lister charges his professional visitors, I am, fortunately, not answerable for it;* and if Mr. Lister had taken the slightest trouble to search English medical literature alone, he would easily have convinced himself of his own grave error in this respect. I think most, if not all, the medical and therapeutic journals of England have alluded more or less to the subject during the last six or seven years.† Mr. Lister has published all his professional papers in the *Lancet* and the *Edinburgh Medical Journal*, and is, therefore, it is to be fairly presumed, acquainted more or less with the *surgical* papers and announcements contained in these two periodicals at least. In both of these journals he will find the matter brought under

Identity of
Creasote
and Carbo-
lic Acid.

* Dr. Lemaire correctly describes *creasote* as often an impure carbolic acid, or a combination of carbolic acid and hydrate of cresyle. It was used in the Edinburgh Infirmary in 1842 by Dr. Handyside, and subsequently, in burns, etc. On its surgical employment as a lotion or ointment, and on its olden more masked forms of petroleum, etc., see the learned and remarkable *Treatise on Creasote* by Dr. Cormack (Edinburgh, 1836). On its use as an antiseptic in wounds in the Leeds Hospital, see Sixth Report of the Officer of Health for 1864.

Notices of
the practice
in British
Medical
Journals.

† See for example the Sydenham Society's *Year-Book* for 1860, p. 486.

The *Lancet*, November 30, 1861, and December 13, 1863.

The *Medical Times and Gazette*, March 10, 1860, and November 25, 1865.

The *Journal of Practical Medicine and Surgery* for 1860, p. 511.

Braithwaite's *Retrospect*, vol. xlviii. for 1863, p. 367; and 1864, p. 359.

The *British Medical Journal* for 1864, pp. 263 and 264.

The *Pharmaceutical Journal and Transactions* for 1861-2, p. 319.

The *Edinburgh Medical Journal*, September 1859, and January 1864, etc. etc.

the notice of the surgical profession within the last six or seven years

Thus six years ago, in the *Lancet* for 1861, p. 536, in an analysis of Dr. Lemaire's first essay—for he published three separate essays before he published his book in 1863,—it is stated: "M. Lemaire considers pus as a secretion separated from the liquor sanguinis, and also from mucus, by a special form of decomposition or fermentation. To the power possessed by coal-tar in arresting this fermentation he attributes its sanative effects. The arrest, he says, of the special decomposition is identical with the arrest of the purulent exudation." This was published in 1861. Is it not the same reasoning—but more explicit and advanced—which Mr. Lister has published in May 1867, and considers as "entirely new"?

Later, in the *Lancet* for December 13, 1863, Mr. Lister would have found a communication, by Mr. Calvert of Manchester, "On the Therapeutical Properties of Carbolic Acid," with notes of its employment in various surgical affections, by Mr. Turner, Mr. Campbell de Morgan, Dr. Whitehead, and others. In the *Lancet* for October 19, 1867, p. 502, Mr. Lister disparages what he chooses to term the "insignificance of the results" arrived at by Dr. Lemaire in his work "On Carbolic Acid," though these results humbly appear to me to include the whole of what he terms the "magnificent results" to be expected from his proposed applications of carbolic acid,—and much more. In a preceding number of the *Lancet* (October 5, p. 444), Mr. Lister asks the correspondent of the journal, "who has been investigating the surgery of Paris," to tell whether or not he has there witnessed the use, as lately practised at Glasgow, of carbolic acid in surgery? But, in the *Lancet* of September 28, the very correspondent (Mr. Sampson Gamgee), to whom and to whose testimony he appeals, had *already* stated (see p. 393) that, "for the last six years, an anti-putrescent lotion, containing one part of carbolic acid to 100 of water, has been regularly employed in dressing wounds in M. Maisonneuve's clinique." Could any statement be more explicit? And why should Professor Lister thus strangely affect to ignore a statement only eight days old?

Again, in the *Edinburgh Journal* for 1859-60 is published a paper on the Coagulation of the Blood, by Mr. Lister, at that time a lecturer on surgery in Edinburgh. At page 264 of the same volume is an article headed "Sanitary Science and Surgery." It describes the pastes, powders, etc., of Corne and Demeaux, their composition, effects in surgery, etc.; and then it is added, editorially—"Of the importance of disinfectants there can be no doubt; they are the great desideratum of the day. . . . It is of immense importance to sanitary science, as well as to surgery, that the disinfectant powers of the products of coal-tar should be fully investigated. The efficiency of *Carbolic Acid* and its compounds seems to exceed that of any disinfectant yet discovered." The editor refers to Mr. M'Dougall's disinfecting powder, patented in 1854, as containing carbolic acid, and, like Corne's

powder, as furnishing five per cent of carbolate of lime ; and states that it had been used therapeutically by me (in 1858) as an application to cancerous ulcers,* and proposed by Professor Anderson for purifying the Clyde. This was published in 1859.

Avoidance
of Surgical
Fever or
Pyæmia.

One great and most laudable object which Professor Lister evidently has in view in using carbolic acid as a local dressing to wounds is to close these wounds entirely by the first intention, and without any suppuration ; so far, by this means, averting the mischances of surgical fever. These paramount objects have been already attained in the hospital of Aberdeen by the use of acupressure. In the Surgical Section of the Association to which Mr. Lister read his paper in Dublin, Dr. Pirrie of Aberdeen stated that, for example, out of twelve cases of excision of mammary tumour treated with acupressure in his practice during the last two or three years, eight out of the resulting wounds had closed entirely by the first intention, and *without the formation of a single drop of pus* ; and yet no kind of antiseptic was used, and the wounds were exposed most fully and freely before closure to the admission of the supposed infusoria. In relation to these "magnificent results"—to use Mr. Lister's expression,—I would beg to ask him if even a single case of such mammary wound, treated with ligatures, healing up without a drop of pus, *ever* occurred in the hospitals of Glasgow or Edinburgh since the day of the first institution of these hospitals in the last century up to the present time ?

Healing
without
pus.

Aberdeen
results.

Besides, Professor Pirrie assured the Surgical Section that Pyæmia had disappeared from the wards of the hospital in Aberdeen ever since acupressure (but without carbolic acid) had been introduced ; and one of the very objects Professor Lister has in view, as every philosophic surgeon ought to have, is the banishment, so far as possible, of that disease from surgical practice. Hence, in the last published annual returns of the Aberdeen Hospital, the mortality attendant on amputations of the limbs is not more than about 1 in 7 ; 3 having died out of 20 operations. In the last published annual report of the Glasgow Hospital (for 1866), out of 81 cases of amputations of the limbs, 35 died,—or they died in the proportion of above 1 in $2\frac{1}{2}$; while in the last published annual return of the Edinburgh Hospital (1864-65), the mortality in amputations of the limbs was nearly in the proportion of 1 in $2\frac{1}{2}$,—the number of these operations being 72, of which 30 proved fatal : results which are sufficiently startling.

Glasgow,
etc.

* See *Medical Times* for January 1859, pp. 50 and 152.